

## CLAIMS

What is claimed:

1. In a data-over-cable system, a method for proxying first protocol network services, the method comprising:

5 creating a database record comprising identification data of a second network device and identification data of a first protocol network server selected by the second network device;

intercepting a first protocol offer message from the first protocol network server to the second network device; wherein the first protocol offer message comprises a routable network address for the second network device and a lease time interval for the routable network address;

10 modifying the lease time interval in the first protocol offer message intercepted on the first network device; and

sending the modified first protocol offer message from the first network device to the second network device.

15 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 1.

3. The method as claimed in claim 1, wherein the first protocol network services comprise Dynamic Host Configuration network services.

20 4. The method as claimed in claim 1, further comprising, storing the lease time interval received in the first protocol offer message and the modified lease time interval in the database record associated with the second network device.

5. The method as claimed in claim 1, wherein the first network device comprises a cable modem, the second network device comprises a customer premise equipment entity and the first protocol network server comprises a Dynamic Host Configuration Protocol server.

5 6. The method as claimed in claim 1, wherein the first protocol offer message comprises a Dynamic Host Configuration Protocol Offer message.

7. The method as claimed in claim 1, further comprising:  
receiving a first protocol request message on the first network device from the second  
10 network device prior to an end of the modified lease time interval provided to the second  
network device, the first protocol request message defining a lease renewal request for the  
routable network address associated with the second network device;  
intercepting the first protocol request message on the first network device prior to the first  
protocol network server receiving the first protocol request message;  
15 generating a first protocol response message on the first network device using the  
identification data of the first protocol network server, the lease time interval provided in the first  
protocol offer message and the modified lease time interval; and  
sending the first protocol response message to the second network device.

20 8. The method as claimed in claim 7, wherein the first protocol response message comprises a Dynamic Host Configuration Protocol message.

9. The method as claimed in claim 7, further comprising, specifying a remaining  
lease time interval in the first protocol response message, wherein the remaining lease time

interval is determined using the lease time interval specified in the first protocol offer message and further using the modified lease time interval.

10. The method as claimed in claim 1, further comprising:

5 generating a first protocol request message on the first network device using the identification data of the second network device, the first protocol request message defining a lease renewal request for the routable network address of the second network device; and

10 sending the first protocol request message from the first network device to the first protocol network server prior to an expiration of the lease time interval specified in the first protocol offer message received from the first protocol network server.

11. The method as claimed in claim 10, wherein the first protocol request message comprises a Dynamic Host Configuration Protocol Request message.

12. The method as claimed in claim 1, further comprising:

determining whether the second network device is not using the routable network address; and if so,

using the routable network address of the second network device on the first network device.

13. The method as claimed in claim 10, further comprising:

receiving a first protocol reply message from the first protocol network server, the first protocol reply message defining new lease time interval for the routable network address of the second network device; and

generating a first protocol reply message for the second network device upon a receipt of a first protocol request message from the second network device, wherein the first protocol reply message comprises modified new lease time intervals.

5           14. In a data-over-cable system, a method for proxying first protocol network services, the method comprising:

          creating a database record comprising identification data of a second network device and identification data of a first protocol network server associated with the second network device;

          intercepting a first protocol offer message from the first protocol network server to the  
10       second network device, the first protocol offer message comprising a routable network address for the second network device and a first lease time interval associated with the routable network address;

          modifying the lease time interval defined in the first protocol offer message, wherein the lease time interval is modified to a shorter lease time interval;

15           sending the modified first protocol offer message to the second network device;

          generating a first protocol request message on the first network device using the identification data of the second network device, the first protocol request message comprising a lease renewal request for the routable network address associated with the second network device; and

20           sending the first protocol request message to the first protocol network server prior to an end of the lease time interval specified in the first protocol offer message.

15. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 14.

16. The method as claimed in claim 14, wherein the first network device comprises a cable modem, the second network device comprises a customer premise equipment entity and the first protocol network server comprises a Dynamic Host Configuration Protocol network server.

5 17. The method as claimed in claim 14, wherein the first protocol offer message comprises a Dynamic Host Configuration Protocol Offer message, and the first protocol request message comprises a Dynamic Host Configuration Protocol Request message.

18. The method as claimed in claim 14, further comprising:

10 receiving a first protocol response message from the first protocol network server, the first protocol response message defining a new lease time interval for the routable network address associated with the second network device;

intercepting a first protocol request message from the second network device, the first protocol request message defining a lease renewal request;

15 generating a first protocol response message on the first network device using the identification data of the first protocol network server, the first protocol response message defining a second lease time interval, wherein the second lease time interval comprises a shortened lease time interval defined in the first protocol response message received from the first protocol network server; and

20 sending the first protocol response message generated on the first network device to the second network device.

19. The method as claimed in claim 18, wherein the first protocol response message from the first protocol network server comprises a Dynamic Host Configuration Protocol Offer

message, the first protocol request message comprises a Dynamic Host Configuration Protocol Request message and the first protocol response message generated on the first network device comprises a Dynamic Host Configuration Protocol Offer message.

5           20. In a data-over-cable system, a method for proxying first protocol network services, the method comprising:

          creating a database record comprising identification data of a second network device and identification data of a first protocol network server associated with the second network device;

          intercepting a first protocol offer message from the first protocol network server on a first  
10 network device, the first protocol offer message comprising a routable network address for the second network device and a lease time interval associated with the routable network address;

          storing the routable network address and the lease time interval in the database record;

          determining whether the second network device is inactive; if so,

          determining on the first network device whether to renew a lease of the routable network  
15 address using the lease time interval stored in the database record; and

          renewing the lease of the routable network address associated with the second network device from the first network device prior to an expiration of the lease time interval stored in the database record.

20           21. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 20.

          22. The method as claimed in claim 20, wherein the step of renewing the lease of the routable network address associated with the second network device comprises:

generating a first protocol request message on the first network device using the identification data of the second network device and the identification data of the first protocol network server; and

sending the first protocol request message to the first protocol network server prior to the expiration of the lease time interval stored in the database record.

23. The method as claimed in claim 20, wherein the first network device comprises a cable modem, the second network device comprises a customer premises equipment entity, and the first protocol network server comprises a Dynamic Host Configuration Protocol server.

24. A system for proxying first protocol network services in a data-over-cable system. the system comprising:

a database comprising a record for a second network device in communication with the first network device, the record comprising identification data of the second network device and identification data of a first protocol network server selected by the second network device; and

the first network device intercepting first protocol messages between the second network device and the first protocol network server associated with the second network device, the first network device modifying a first protocol offer message from the first protocol network server, wherein the first network device modifies a lease time interval of a routable network address for the second network device and sends the modified first protocol offer message to the second network device.

25. The system as claimed in claim 24, wherein the first network device uses the identification data associated with the second network device to generate a first protocol lease

renewal request message and sends the first protocol lease renewal message prior to an end of the lease time interval specified in the first protocol offer message.

26. The system as claimed in claim 24, wherein the first network device stores the lease time interval specified in the first protocol offer message and the modified lease time interval in the record of the second network device.

27. The system as claimed in claim 24, wherein the first network device uses the identification data of the first protocol network server, the lease time interval specified in the first protocol offer message and the modified lease time interval to generate a first protocol response message for the second network device upon intercepting a first protocol lease renewal request message from the second network device, the second network device sending the first protocol lease renewal request message upon an end of the modified lease time interval.

28. The system as claimed in claim 27, wherein the first network device sends the generated first protocol response message to the second network device.

29. The system as claimed in claim 27, wherein the first network device specifies a remaining lease time interval in the first protocol response message.

30. The system as claimed in claim 24, wherein the first network device comprises a cable modem, the second network device comprises a customer premise equipment entity and the first protocol network server comprises a Dynamic Host Configuration Protocol network server.



31. The system as claimed in claim 25, wherein the first protocol messages comprise Dynamic Host Configuration Protocol messages.

32. In a data-over-cable system, a method for proxying DHCP network services, the  
5 method comprising:

creating a specialized task on a first network device for a second network device upon a receipt of a first message from the second network device including a request to discover a routable network address for the second network device;

10 intercepting a first protocol offer message from a Dynamic Host Configuration Protocol server selected by the second network device, wherein the first protocol offer message comprises a routable network address for the second network device and a renewal lease time interval associated with the routable network address;

15 modifying the lease time intervals on the first network device prior to sending the first protocol offer message to the second network device; and

generating a lease renewal request message on the first network device using  
identification data of the second network device and identification of the Dynamic Host Configuration Protocol server; and

20 sending the lease renewal request message to the Dynamic Host Configuration Protocol server prior to an expiration of the renewal lease time interval associated with the routable network address.

33. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 32.